IN THE CLAIMS

This listing of claims is presented again as a courtesy.

Listing of Claims

Claims 1 to 5 (cancelled).

Claim 6 (previously presented): A fuel rod for a nuclear reactor that is cooled by water, comprising:

a cylindrical tubular cladding;

a column of nuclear fuel pellets that are stacked one on top of another inside the tubular cladding in the axial direction of the cladding;

a first plug for tight closure of a first axial end of the cladding of the rod arranged at a lower portion of the fuel rod when the rod is in an operating position inside the nuclear reactor, the cladding of the rod having an axis vertical; and

a second plug for tight closure of the second axial end of the cladding, the column of fuel pellets resting on an inner portion of the first plug, referred to as a lower plug, via a first lower end, and being retained inside the tubular cladding by a compression spring that is interposed between a second upper axial end of the column of fuel pellets and an end of an inner portion of the second plug, referred to as the upper plug, wherein the inner portion of the lower plug engaged inside the tubular cladding successively comprises, in the axial direction and in a direction from the first towards the second end of the cladding, a first cylindrical portion that has a diameter that is substantially equal to the inner diameter of the tubular cladding, a second cylindrical portion that has a diameter that is smaller than the inner diameter of the tubular cladding and a third cylindrical portion that has a diameter that is smaller than the inner diameter of the tubular cladding and that is greater than the diameter of the second cylindrical portion so that there remains, between a lateral outer surface of the third cylindrical portion and an inner surface of the tubular cladding, a radial clearance for passage of gas and a substantially planar end surface on which the first end of the column of fuel pellets rests, so that an annular space for expansion of gas is formed between the outer surface of the second portion of the inner portion of the lower plug and the inner surface of

the cladding, a volume of the annular space being a function of expansion of gas in the fuel rod during operation.

Claim 7 (previously presented): The fuel rod according to claim 6, wherein the third cylindrical portion of the inner portion of the lower plug of the fuel rod has a diameter such that there remains, between the outer lateral surface of the third cylindrical portion and the inner surface of the tubular cladding, a radial clearance for assembly and passage of gas of between one and two tenths of a millimeter.

Claim 8 (previously presented): The fuel rod according to claim 6, wherein the second cylindrical portion of the inner portion of the lower plug has a diameter of between 40% and 60% of the inner diameter of the tubular cladding and a length in the axial direction of between 8 and 10 times the inner diameter of the tubular cladding.

Claim 9 (previously presented): The fuel rod according to claim 6, wherein at least a portion of the fuel pellets of the column of fuel pellets comprises one of plutonium oxide and a mixed oxide of uranium and plutonium.

Claim 10 (previously presented): The fuel rod according to claim 6, further comprising:

at least one cross-member in at least one zone of the second cylindrical portion, extending in an axial direction, the at least one cross-member constituted by a diametrically widened cylindrical portion of the second cylindrical portion that has an outer diameter that is substantially equal to the inner diameter of the tubular cladding that is reduced by an assembly clearance.

Claim 11 (previously presented): A fuel rod for a nuclear reactor that is cooled by water, comprising:

a cylindrical tubular cladding;

a column of nuclear fuel pellets that are stacked one on top of another inside the tubular cladding in the axial direction of the cladding;

a first plug for tight closure of a first axial end of the cladding of the rod arranged at a

lower portion of the fuel rod when the rod is in an operating position inside the nuclear reactor, the cladding of the rod having an axis vertical; and

a second plug for tight closure of the second axial end of the cladding, the column of fuel pellets resting on an inner portion of the first plug, referred to as a lower plug, via a first lower end, and being retained inside the tubular cladding by a compression spring that is interposed between a second upper axial end of the column of fuel pellets and an end of an inner portion of the second plug, referred to as the upper plug, wherein the inner portion of the lower plug engaged inside the tubular cladding successively comprises, in the axial direction and in a direction from the first towards the second end of the cladding, a first cylindrical portion that has a diameter that is substantially equal to the inner diameter of the tubular cladding, a second cylindrical portion that has a diameter that is smaller than the inner diameter of the tubular cladding and a third cylindrical portion that has a diameter that is smaller than the inner diameter of the tubular cladding and that is greater than the diameter of the second cylindrical portion so that there remains, between a lateral outer surface of the third cylindrical portion and an inner surface of the tubular cladding, a radial clearance for passage of gas and a substantially planar end surface on which the first end of the column of fuel pellets rests, so that an annular space for expansion of gas is formed between the outer surface of the second portion of the inner portion of the lower plug and the inner surface of the cladding,

wherein at least a portion of the fuel pellets of the column of fuel pellets comprises one of plutonium oxide and a mixed oxide of uranium and plutonium.

Claim 12 (previously presented): A method for manufacturing the fuel rod as recited in claim 6 comprising:

determining the volume of the second intermediate portion as a function of expansion of gases in the fuel rod during operation.

Claim 13 (previously presented): The fuel rod as recited in claim 6 wherein a pressurization gas and gases released by the fuel pellets during operation fill the annular space.